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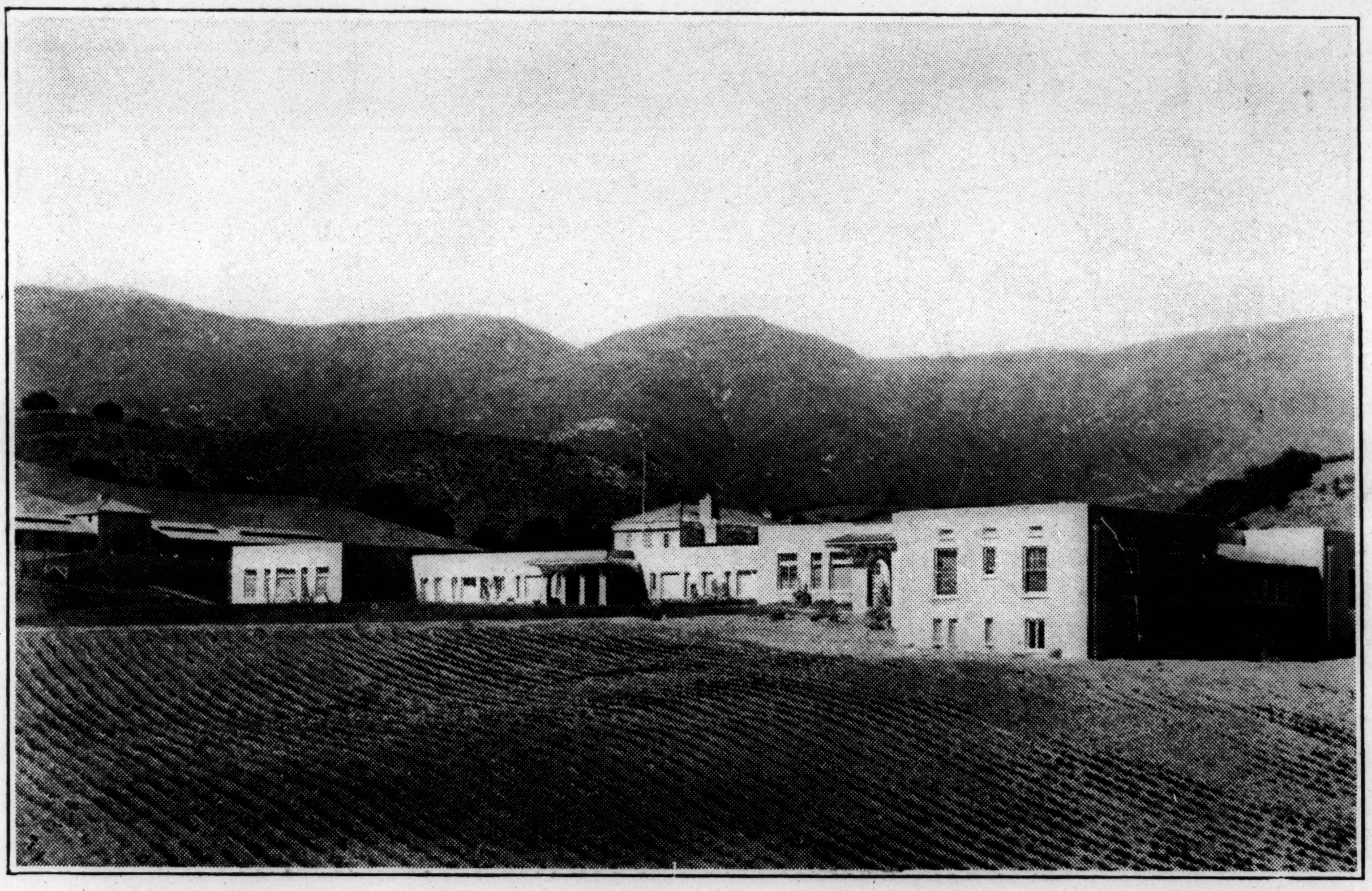

Antonio Sanatorium, Santa Barbara; one of California's new model county tuberculosis sanatoria.

¶ DISINFECTION OF BATHING SUITS

¶ OCTOBER, 1919

California State Board of Health.

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STUDIES IN BACTERIOLOGICAL SAMPLING AND DISINFECTION OF BATHING SUITS AND TOWELS.

By C. G. GILLESPIE, Chief Engineer, and HARRY N. JENKS and RAY F. GOUDEY,
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In April, 1917, through legislative action the State of California delegated to the State Board of Health supervision over the sanitation, healthfulness and safety of swimming pools, bathhouses, public swimming and bathing places and all related appurtenances, and empowered the Board to make and enforce such rules and regulations pertaining thereto as it might deem proper. The act provides, in addition, for the granting and revocation by the State Board of Health of permits for the construction or operation of all swimming pools within the state; declares places and things in violation of this act to be nuisances dangerous to health, which may be summarily abated in the manner provided by law; and defines violations of the act to be misdemeanors punishable by fine or imprisonment, or both, of owners or employees. Through the adoption of this act, California became one of the first states to recognize the importance of swimming pool sanitation and to correlate it with the other public health activities of the State Board of Health.

Since the passage of the act just referred to, the Bureau of Sanitary Engineering, to which the enforcement of the act was delegated by the Board, has been making an extensive survey of the pools and bathhouses throughout California, with a view to obtaining a sufficiently reliable and comprehensive fund of information to serve as a basis for the formulating of a definite set of standards governing the construction and operation of public swimming pools and appurtenances. General regulations, based upon the data at hand, were formally adopted August 2, 1919. Among the proposed requirements is one relative to the laundering of the bathing suits and towels supplied to the patrons of each bathing establishment. The rule states that "bathing suits and towels shall be thoroughly cleaned and sterilized after each use." The subject of the present inquiry is a consideration of suitable methods of meeting this standard.

A. TECHNIC OF SAMPLING.

The first step taken in pursuing the present studies was the development of a satisfactory technic for sampling bathing suits and towels. In conducting the necessary experiments in this connection, and also in the case of subsequent studies in disinfection, use was made of the laundry of a well known outdoor swimming pool in Oakland. The suits supplied by the management are of cotton, one piece goods, and about three years old. The towels are of cotton, 18 inches by 30 inches, and of medium weight.

The first method of sampling tried was that of placing the article into a known amount of distilled water so as to completely submerge the piece. After the article had been thoroughly rinsed in this water, and then removed, the number of bacteria per cubic centimeter of the rinse water was determined in the laboratory. By running a blank on the distilled water, the actual number of bacteria contributed by the suit or towel was ascertained, and this count in turn was expressed in terms of number of bacteria per square centimeter of surface of the article sampled.

In view of several inherent disadvantages of this method, it is considered to be an impractical one for field determinations. The chief objections are the large quantity of distilled water required, the necessity of making a blank determination on this water, and the practical impossibility of sterilizing the bucket or receptacle in which the rinsing is done, and of avoiding contamination of the suit and water during the rinsing process. Again, if the counts from different suits are to be of comparative value, they must be referred to the number of square centimeters of the article sampled, which necessitates a separate measurement for each suit. The advantages of the method consist in the high counts obtained on agar plates when 1 cubic centimeter of the rinse water is used, and also in the fact that the counts give automatically the average condition over the entire suit or towel under test.

The second method tried was that of passing known amounts of controlled water through restricted portions of the bathing suit, recovering the amount shaken through and sampling it. This was effected by utilizing two wide mouth, 4-ounce glass stoppered bottles, such as those used normally in the collection of water samples; 100 cubic centimeters of controlled water was put in one bottle, the two bottles being then placed mouth to mouth with one thickness of the bathing suit stretched between and forming a sort of diaphragm through which the water passed into the empty bottle by vigorous shaking back and forth for fifty times. It was found that from 10 to 25 cubic centimeters of the water passed through and presumably had washed out the bacteria contained in the portion of the suit wetted. The counts on agar could therefore be reduced to so many bacteria per square centimeter of the area sampled.

Upon using this method in the field, however, it was quickly shown that it yields inconsistent results. It was found that the counts were, on the average, 100 to 200 times lower per square centimeter than those obtained by the rinsing of the entire suit. This led to the conclusion that all the bacteria were not removed by the passage of the water from one bottle to the other. That this was the case was proved by wringing out carefully and analysing the water absorbed by the portion of the suit between the mouths of the bottles and the area wetted on the outside through capilarity. The analysis showed 85,000 bacteria per cubic centimeter in the water thus recovered.

During the course of the above experiments, a portion of a towel being sampled was inserted into the bottle instead of being stretched across the mouth. After being shaken up vigorously as before, the water was analysed and found to yield a count on agar comparable to that obtained when the entire towel was rinsed as in the first method. This result suggested the development of the following technic, which, it is believed, represents a satisfactory method of field sampling of bathing suits and towels, and is the method now in use.

For each sample a sterile glass rod and a glass stoppered bottle, containing a definite amount of sterile water, are required. The rod should be 5 inches long, with a file mark 3 inches from one end. The bottle used should preferably be the same as that employed in the collection of water samples, in order that samples of pool water and bathing suits and towels may be obtained at the same time and that the bottles in general may be used for either purpose. The sterile rods are carried in a can similar to a pipette sterilizing can. A wide mouth, glass stoppered 4-ounce bottle is used for sampling purposes. It was found that a convenient quantity of water to be placed in the bottle is 90 cubic centimeters. This leaves enough space for the insertion of the portion of the article to be sampled, and at the same time permits a loss of 15 to 20 cubic centimeters by absorption into the suit. That portion of the suit or towel to be sampled is laid loosely over the open mouth of the bottle. Using the glass rod, the material is pushed down into the bottle three inches, or until the file mark on the rod is level with the opening. When inserted to this point, the area of the material wetted is a circle approximately 6 inches in diameter. The stopper is replaced over the suit and the bottle is given 50 shakes up and down. The inserted portion of the suit is withdrawn slowly, in order to allow the free water to drain back into the bottle, which is then restoppered, capped, and sent to the laboratory for analysis. This consists in plating 1 cubic centimeter of the water on agar and incubating it for 24 hours at 37 degrees Centigrade, according to American Public Health Association standard methods. The measure of contamination of the bathing suit or towel is the bacterial count found at the end of the incubation period.

That this method of sampling furnishes a reliable index of the sanitary condition of the suits and towels, was demonstrated in actual practice during the course of the experiments presently to be described. Grossly contaminated articles are indicated by counts of 200,000 or over (characterized as "innumerable"), well-laundered articles yield counts less than 100, while in the case of articles known to be sterile, or practically so, the plates will be sterile or will show counts less than 10.

Having determined upon the foregoing method of obtaining samples, further studies were made to ascertain what portion or portions of the bathing suit or towel should be sampled in order to secure counts as uniform and comparable as possible.

Experiments indicate that there is a lack of uniformity of distribution of bacteria, but that in general the counts obtained from corresponding parts of different suits and towels are sufficiently alike to make it unnecessary to sample more than one portion to secure comparable results. From the series of tests it was concluded that satisfactory counts, as regards both uniformity and actual numbers, can best be obtained by sampling the middle of the breast of the bathing suit, and, similarly, the middle of the towel. No advantage seems to be gained by sampling more than one portion. During the course of subsequent experiments, the correctness of these conclusions was established by the fact that suits and towels sampled in this manner, either raw, plain-laundered or disinfected, yielded entirely comparable counts.

It is concluded from our results that the method described represents a convenient, inexpensive way, adapted to field use, of ascertaining whether the laundry work carried on in connection with the operation of any particular swimming pool under investigation, is meeting such a condition of cleanliness and practical sterility as is required by the California State Board of Health.

B. DISINFECTANTS TESTED, AND PRELIMINARY STUDIES IN DISINFECTION.

In order first to determine the general suitability of various disinfectants for the purposes in view, and to ascertain approximately within what range such factors as strength of disinfectant, contact period and quantity of disinfectant per suit might be varied, a series of experiments was carried out, using a few suits and towels at a time and effecting the different operations in galvanized iron pails of convenient size. After this preliminary work had been done, the investigation was extended further to include several experiments on a working scale, using the machinery and equipment at hand in two different swimming pool laundries in Oakland and one in San Francisco.

The disinfectants tested included the following: Coal tar disinfectants, coal tar acids, and chlorine compounds. As an example of the first group, a commercial product called "Rednol" was studied, which, according to the manufacturers,* is made the same as, and can be used in the place of, the well known disinfectant, "Lysol." It is stated on the label that "Rednol" contains 50 per cent cresol, made water soluble by saponification with 50 per cent green soap. A second coal tar product, prepared by the same company under the name of "Creo-Fenol," belongs to the general class of disinfectants known as sheep dips. According to the label, the dip contains rosin 25 per cent, caustic soda 3 per cent, tar acids 20 per cent, hydrocarbons 42 per cent and water 10 per cent. It forms a milky emulsion when added to water in the amounts required for disinfection. No phenol coefficients are given for either "Rednol" or "Creo-Fenol," but according to a statement by the manufacturers, the composition of "Rednol" corresponds to the formula for Liquor Cresolis Compositus U. S. P., with the exception that a vegetable oil other than linseed is used in "Rednol." The strengths of the two preparations are considered the same. According to the United States Dispensatory, the phenol coefficient of Liq. Cresolis Comp., with and without organic matter, is 1.87 and 3.00, respectively.

The three coal tar acids considered for purposes of bathing suit and towel disinfection were cresylic acid, crude carbolic acid, and pure phenol. The first two of these were found to be unsuitable because of their insolubility in water, as evidenced by the slimy scum produced upon diluting the acid with water to make up a solution of the desired strength. Attempts made to increase their solubility through the addition of soap were unsuccessful. After the first experiment, also, no further study was made of phenol, because, although found suitable from the standpoint of disinfection, it was seen that its use would be governed by considerations of cost which could not be readily ascertained except by detailed investigation.

Only one chlorine base disinfectant was studied, namely, a commercial product known as "Clorox",† since it is considered that practically identical results are to be expected with the use of an equivalent amount of bleaching powder. "Clorox" is a solution prepared electrolytically from brine, and is manufactured in two strengths, the weaker, containing about 6 per cent available chlorine, being sold for household uses; while the stronger, containing 20 per cent available chlorine, is bought by laundries, etc., for bleaching purposes. The chlorine is made soluble, in the high percentages noted, through the addition of 1 per cent soda ash to the household solution, while in the case of the bleaching solution the soda ash is added to the point of saturation. The great advantage of "Clorox" over ordinary calcium hypochlorite lies in the fact that it comes in the form of a clear solution, which may be applied directly to the water or material to be disinfected.

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*Messrs. Coffin-Redington Company, San Francisco.

†Manufactured by the Electro-Alkaline Company, Oakland, California.

The rate of deterioration of "Clorox" within a given period is considerably less than that of chlorinated lime. Results of observations in the laboratory on the 6 per cent solution showed that the loss of available chlorine is a gradual one, amounting to 20 per cent in 40 days, or approximately 0.5 per cent per day. On the other hand, for different lots of the disinfectant, decided variations are noted in the original available chlorine content, which accordingly needs to be determined in each case.

The following tables and discussion related thereto are now presented to show the results obtained from the set of experiments made prior to the disinfection and laundering of bathing suits and towels under working conditions.

TABLE No. 1.

Showing Disinfection Secured by Solutions of Different Strengths of Water-Soluble Coal Tar Disinfectant. Also Effect of Subsequent Open Air Drying in the Removal of Residual Bacteria.

Strength of solution per cent	Contact period, minutes	Agar count, 24-hour at 37 degrees C.	Count after open-air drying 4.5 hours
0.5	15	5,500	90
0.7	15	900	55
0.8	15	110	10
0.9	15	100	9
1.0	15	75	13
1.1	15	90	40
1.25	15	2	45

Conditions of Experiment. The test was made on raw suits as received from the dressing rooms. Two gallons of the disinfecting solution ("Rednol") of the different strengths shown was made up in pails, in each of which two raw suits were placed and allowed to remain for 15 minutes without agitation. Upon removal they were thoroughly rinsed twice in cold water, in order to wash out the residual disinfectant, and were then sampled. After this the suits were hung on a line to dry in the wind and sun. When dry, they were sampled again to determine the extent to which the bacteria had been reduced by this treatment.

Conclusions. Results indicate that a strength of solution in the neighborhood of 1 per cent will give disinfection with a 15-minute contact period. Care must be taken to remove the last traces of disinfectant when the strength is above 1 per cent, if discoloration of dyed articles and stickiness are to be obviated. The further bacterial reduction effected by drying in the open air may be due in part to the action of small amounts of residual disinfectant not washed out during the rinsing process. But, aside from this possibility, sun-drying appears to offer an effective means toward securing practical sterility in the bathing suits, and should serve as a helpful adjunct to any method of laundering adopted with this purpose in view.

TABLE No. 2.

Showing Bacterial Removal Corresponding to Different Periods of Contact, Using a Low Strength of Solution.

Water soluble coal tar disinfectant, solution 0.75 per cent		Sheep dip, solution 0.6 per cent	
Contact period, minutes	Agar count	Contact period, minutes	Agar count
5	1,500	5	6,000
10	1,500	10	1,500
15	2,000	15	1,000
20	1,800	20	1,200
30	1,000	30	700
60	1,000	60	600

Conditions of Experiment. Two gallons of 0.75 per cent solution of "Rednol" and 2 gallons of 0.6 per cent "Creo-Fenol" were made up in pails. For each disinfectant, the same suit was used throughout the experiment. At the end of each contact period, the suit was removed, rinsed thoroughly and sampled. It was then replaced in the disinfectant and allowed to remain sufficiently longer to make the total period of contact equal in turn to the number of minutes given in the table. Only 0.6 per cent strength of sheep dip was used, because in greater strengths it imparted a stickiness to the suits which can be removed only by repeated rinsings.

Conclusions. With the strength of solution chosen, disinfection is not complete even with a period of contact of one hour. The action of the coal tar disinfectants is a slow one. It appears probable that the disinfecting solution must be at least of a certain critical strength to destroy completely the bacteria, unless impracticably long periods of contact are allowed. Because a solution of given strength disinfects in one hour, it does not necessarily follow that a solution of half the given strength will disinfect in two hours, or even longer.

TABLE No. 3.

Showing Bacterial Reduction Resulting from Different Contact Periods, with Given Strength of Solution of Water Soluble Coal Tar Disinfectant=1 per cent.

Suit number	Contact period, minutes	Agar count 24 hours at 37 degrees C.		Per cent reduction
		Raw suit	Disinfected suit	
1	5	90,000	15,000	83.0
2	10	20,000	2,500	87.5
3	15	30,000	25	99.9+
4	30	50,000	1,000	98.0
5	60	60,000	15	99.9+
6	120	50,000	120	99.8

Conditions of Experiment. Raw suits were used as received from the dressing rooms. Prior to disinfection, each suit was sampled and allowed to remain, for the corresponding contact period given in the table, in a bucket containing two gallons of a 1 per cent solution of the disinfectant. At the end of the period the suit was taken out, rinsed thoroughly and sampled.

Conclusions. Disinfection is incomplete for periods of contact less than 15 minutes, while for longer periods the degree of bacterial removal does not increase materially. The results indicate that with the strength of solution used, the period of contact should be at least 15 minutes. If, under working conditions, a longer time may be allowed, the disinfecting action may be expected to be more reliable, although not necessarily more complete.

TABLE No. 4.

Effect of Rinsing Prior to Disinfection; Also Results of Disinfecting in Series, Using Same Solution Throughout Test.

Suit number	Agar count, raw suit	Number of rinses	Agar count after rinsing	Agar count after 15-minute disinfection
1	30,000	3	2,500	700
2	10,000	3	50	15
3	30,000	3	20,000(?)	250
4	10,000	3	1,300	300
5	4,000	3	60	10

Conditions of Experiment. One gallon of the disinfecting solution was made up in a pail to 1 per cent. Each suit was sampled raw, then rinsed three times in cold water, using one gallon of water for each rinse and giving suit ten jounces up and down during each rinsing. The bulk of the sand and dirt contained in the suit was removed by the first rinse water. After the three rinsings the suit was wrung out, sampled again, and placed in the disinfectant, where it was allowed to remain for 15 minutes. After rinsing thoroughly to remove the disinfectant, the suit was sampled to ascertain the number of bacteria that survived the combined treatment of rinsing and disinfection.

Conclusions. The experiment demonstrates clearly that plain rinsing is of value in not only cleansing the suit, but in effecting a considerable reduction of the bacterial contamination. It appears, however, that rinsing alone in cold water, as feasible under working conditions, would in itself not be sufficient to effect practical sterility; in order to destroy the residual bacteria, disinfection is required. As regards the effectiveness of the disinfectant under the conditions of the experiment, it is apparent that with a 15-minute period of contact a 1 per cent solution does not yield uniform results. Rather than lengthen the contact period, it would probably be more economical of labor to increase the strength to 1.5 per cent or 2 per cent, using the solution repeatedly until spent. It is probable that at least six batches of suits, using one gallon of solution per suit, based on the number in each batch, could be passed through a tank of the disinfectant before the action would break down. Comparing Table No. 4 with Table No. 3, it does not appear that the preliminary cleansing of the suits by rinsing has any special value in assisting subsequent disinfection.

In order to ascertain what results might be expected with the use of a chlorine compound as the disinfecting agent, experiments were made with "Clorox" on bathing suits and on towels.

TABLE No. 5.

Showing Results of Treatment of Bathing Suits with a Chlorine-Base Disinfectant.

Available chlorine, parts per million	Count after 15-minute contact	Remarks
10	20,000	
50	20,000	
100	1,200	
500	900	
1,000	3	Bleaching action noted

Conditions of Experiment. Sufficient "Clorox" was made up to two gallons to secure solutions of the strengths recorded in the table, and in each case a suit was immersed in the disinfectant for 15 minutes. At a point corresponding to a strength of 1000 parts per million available chlorine, bleaching of the suit took place. Satisfactory disinfecting action did not, however, occur until this point was reached.

Conclusions. It is concluded that, in the case of dyed bathing suits, a strength of disinfectant corresponding to between 500 and 1000 parts per million available chlorine is required for effective sterilization. This strength can not, however, be used without bleaching the fabric. Disinfection might be secured through the use of a weaker solution and a longer contact period, but as the deterioration of the solution upon standing in an open vat would be considerable, it is believed that in practice it would be difficult so to control the operation that at one and the same time disinfection would be sure to take place and bleaching would be certain not to occur.

TABLE No. 6.

Showing Results of Treatment of Towels with a Chlorine-Base Disinfectant.

0.5 per cent solution containing approximately 315 parts per million available chlorine

	Agar count	Per cent reduction
Raw towel	200,000	
Contact period, minutes		
5	300	99.85
10	250	99.9
15	Sterile	99.9+

Conditions of Experiment. In the case of towels, an experiment in which a 1 per cent solution of "Clorox" (corresponding to 630 parts per million available chlorine) was used, practical sterilization was obtained within 5 minutes. As a longer contact period is readily secured in actual practice, a further test was made, using a 0.5 per cent solution, with results as shown in the above table.

Conclusions. It is concluded that disinfection with chlorine, in any of its commercial forms (hypochlorites or solutions), represents a satisfactory means of treatment for towels. With a 15-minute contact period, approximately 315 parts per million available chlorine is necessary. The slight bleaching action that accompanies the use of this strength of solution is a desirable feature.

C. RESULTS OF EXPERIMENTS UNDER WORKING CONDITIONS.

Having determined by the preliminary experiments described in the foregoing section, the suitability of a water soluble coal tar disinfectant, and of chlorine in its ordinary commercial forms, for the treatment of bathing suits and towels, respectively, further tests were made on a working scale to confirm the results already obtained. In this connection use was made of the laundry machinery and equipment operated by two of the principal swimming pools in Oakland and one in San Francisco.

TABLE No. 7.

Bacterial Reduction Due to Rinsing.

Grab samples of four suits.

Agar count, raw suits	Agar count after first 5-minute rinse	Agar count after second 5-minute rinse	Agar count after third 5-minute rinse
13,000	9,000	4,500	3,000
15,000	10,000	2,000	1,500
50,000	7,000	3,500	6,000
80,000	6,000	4,000	3,000
Averages:			
39,500	8,000	3,500	3,450

Conditions of Experiment. The suits tested had been used by bathers the previous day, and were sampled as received from the dressing rooms. For the purposes of the experiment, in each case of sampling, four suits were picked at random out of the batch. This was thought to give sufficiently representative results. For the 50 suits rinsed, 50 gallons of cold rinse water was admitted into the washer, or 1 gallon of water per suit. After each 5-minute rinse the water was allowed to drain off.

Conclusions. The average counts shown in the table, for the raw suits and for each succeeding rinsing, demonstrate the fact that plain rinsing in cold water may be relied upon to effect a material removal of bacteria from a contaminated bathing suit. The bulk of the dirt contained in the suit is washed out by the first rinse water. From the results it is concluded that in practice no appreciable advantage is to be gained by more than two rinsings. Under working conditions it might be found advantageous to rinse the first time in hot water, using cold water afterwards.

For the purpose of determining what results might be expected in establishments where the cleansing of bathing suits and towels is carried on in the most careless and insanitary manner, a special study was made of the method outlined below, which, it was thought, would represent the most inadequate form of treatment that might be met with in practice:

WASHING	→	AIR-DRYING
Amounting to two rinsings in cold water without the use of soap; followed by de-watering in extractor.		Indoors. Suits used by bathers before actually dry.

The facts brought out by this study are presented in Table No. 8, below:

TABLE No. 8.

Showing Results to be Expected from Inadequate Laundering of Bathing Suits.

Suit number	Agar count after washing	Agar count after air-drying 2 hours; suit still damp but wearable	Agar count after 24 hours; suit dry
1	8,000	7,000	7,000
2	8,000	6,000	3,000
3	8,000	4,000	3,000
4	6,000	3,700	4,000
Average	7,500	5,200	4,300

Conditions of Experiment. Twenty-five suits were sampled raw as they came from the dressing rooms, the average count being 57,500. They were then placed in the washing machine and given two rinses of 10 minutes each in cold water, with no soap. After rinsing, the suits were transferred to the extractor, in which about 4.5 gallons of water were removed and the suits rendered almost dry enough to be worn without discomfort to the bather. A grab sample of 4 suits was obtained at this point, and the corresponding counts are recorded in column 1. After two hours' air-drying indoors the suits were dry enough to be readily accepted by a bather on an occasion when there might be a shortage of suits. Accordingly, the same four suits were sampled again to determine the residual contamination to which such a bather might be subjected. The resulting counts are given in column 2. Column 3 shows the counts obtained after the suits had completely dried, 24 hours after they had been washed.

Conclusions. The experiment demonstrates clearly that a method of laundering as inadequate as the one under consideration is not permissible if a standard of practical sterility of the laundered suits is to be attained. The reduction of bacteria noted in column 1, over the average count of the raw suits, confirms the results of the experiment in plain rinsing recorded in Table No. 7. As to air-drying, it appears that with a high initial count, this stage of the laundering process is not effective in materially reducing the bacterial contamination, so that if the suits are grossly contaminated when hung up to dry, the drying stage can not be relied upon at all to eliminate the bacteria sufficiently to meet the required standard. On the other hand, it seems probable, judging by the results presented in the following Table No. 9, that if the major portion of the contamination is removed by the washing process, the residual bacteria are destroyed during the air-drying stage.

In the following table the results of two tests are given, one upon a batch of suits showing a low initial count on agar, and the other upon a lot showing the normally high counts found to be present in unlaundered bathing suits in the establishment where the test was made.

TABLE No. 9.

Practical Experiment in the Laundering of Bathing Suits, in which the Burden of Bacterial Removal is Placed Upon a Disinfectant.

Agar count, raw suits	Agar count after 15-minute disinfection	Agar count after washing	Agar count after 24-hour air-drying
10,000	40	9	4
11,000	800	18	4
6,000	300	170	6
10,000	25	4	1
Average:			
9,300	290	50	4
50,000	4,000	1,500	10
30,000	1,300	1,200	35
32,000	7,000	1,500	33
20,000	10,000	500	----------
Average:			
33,000	5,600	1,200	26

Conditions of Experiment. Each batch consisted of 25 suits as received from the dressing rooms. After being sampled the suits were placed in a tub containing 25 gallons of 1.5 per cent water soluble coal tar disinfectant (''Rednol''), where the suits were allowed to remain without agitation for 15 minutes. Upon removal from the disinfectant the suits were run through the extractor in order to recover the disinfecting solution absorbed, which was then returned to the tub. A grab sample of four suits was taken at this point, the resulting counts being recorded in column 2 of the above table. The suits were then put into the washer and given two 10-minute rinses, one in hot water and one in cold, no soap being used. The ''washing,'' then, consisted of a rinsing in hot water. As the burden of the bacterial removal was to be placed upon the disinfectant, the washing and drying stages were considered only as supplementary and were accordingly made as simple as possible. The suits were sampled after washing and after air-drying, the corresponding counts being recorded in the last two columns of the foregoing table.

Conclusions. On a working scale, disinfecting action is not as complete as in the case of the preliminary pail experiments, under the same conditions of strength of solution and contact period. (See tables Nos. 1, 3 and 4.) For effective results, it appears that the suits should be agitated in the solution by some mechanical device, in order that the disinfectant may penetrate to every part of the suit. In this connection, also, a longer contact period would contribute materially to the reliability of the disinfecting action. The 15-minute period is proposed as the minimum time in which adequate disinfection may take place. An increase to 30 minutes or more would in most cases be entirely practicable, and should be insisted upon if it is found that consistently good results can not be obtained otherwise. Under the conditions of the present series of experiments, plain rinsing is as effective as disinfection. Plain air-drying (indoors) may be relied upon to make the final count satisfactorily low, provided the contamination, as measured by the count, just prior to drying is in the neighborhood of

1000 or less. The same conclusions apply with equal force to sun-drying and mechanical drying at high temperatures.

TABLE No. 10.

Showing Results of Experiment in Plain Air-Drying of Bathing Suits Indoors.

Agar count, beginning of drying period		Agar count, suits still damp but wearable*		Agar count, suits dried†	
Raw suits	Washed suits	Raw suits	Washed suits	Raw suits	Washed suits
34,000	79,000	205,000	Innumerable	50,000	3,700

*Suits wearable after 2.5 hours drying.
†Suits dry after 24 hours.

Conditions of Experiment. The figures in the table are the average counts obtained from representative samples taken at the different stages of the drying period studied. The tabulation shows the results of parallel tests on raw suits and on washed suits. The apparent anomaly of higher initial counts in the washed suits over those found in the raw suits is explained by the fact that the two classes of suits did not belong to the same washing.

Conclusions. Plain air-drying indoors, in the absence of direct sunlight, is ineffective in the removal of bacteria when the counts at the beginning of the drying period are high. When this is the case, it appears that the warm, moist air in the drying loft actually favors the growth of bacteria in the suits, the maximum counts being reached at that point where, under careless management, bathers are allowed to use the suits before they are thoroughly dry. The danger of such a practice is made apparent by the results of the foregoing experiment. The time factor and desiccation are the important elements that govern the actual bacterial removal from the time the suits are washed until they are subsequently given to the bathers. Judging by the practically sterile results obtained from suits which have lain on the shelves for a few hours up to a day or more, it is believed that after the suits are once dry the bacteria die off very rapidly. It is recommended that as an additional safeguard in the laundering of bathing suits and towels a reasonable amount of storage of these articles, before being used again by the bathers, should be required.

TABLE No. 11.

Showing Effect of Hot-Air Drying in Steam Tumbler; Also Effect of Short Storage of Dried Suits Upon the Removal of Residual Bacteria.

Agar counts, washed suits	Agar counts after hot-air drying 45 minutes	Agar counts, suits stored on shelves 4 hours
50,000	6,000	2,500
25,000	1,000	5,000
20,000	8,000	100
20,000	1,500	500
	3,000	150
	15,000	
Averages:		
28,800	5,800	1,600

Conditions of Experiment. The test was made upon a batch of suits received from the dressing rooms 12 hours previously. After being washed, four suits were picked at random to furnish the average count recorded in the first column of Table No. 11. The suits were then de-watered in an extractor and placed in a steam tumbler. In this machine the suits were exposed to a current of air amounting to 5000 cubic feet per minute, heated to 250–300 degrees Fahrenheit in passing over steam coils. The suits were kept in the tumbler 45 minutes and were sampled after removal, with results as shown in column 2. The counts given in column 3 are from suits washed about 4 hours before the test was made on hot-air drying, and are suits from the same lot accumulated during the previous day's swimming. The effect of this 4 hours' storage after the suits had been dried is indicated.

Conclusions. Even with high initial counts, hot-air drying, under the conditions of the experiment, is effective in removing about 80 per cent of the bacteria. Practical sterility as a result of hot-air drying alone was not observed in the case of either these or other samples taken. As might be expected, however, the hot-air drier is able to treat a much more highly contaminated suit than plain air-drying is capable of doing. Moreover, the results obtained are more dependable. As has already been mentioned in connection with Table No. 10, storage of suits subsequent to drying represents a further step in the removal of residual contamination, and is to be recommended as an additional safeguard in the laundering process as a whole.

CONCLUSIONS.

A complete and thorough laundering process might be indicated as follows:

(1) Disinfection → (2) Washing → (3) Drying → (4) Storage

If the first step is effective, the bathing suits and towels will be practically sterile upon being placed in the washer, and no further treatment is necessary for the removal of bacterial contamination. The next two steps then serve the purpose of cleansing the articles from non-living waste matter and of rendering them more acceptable for use by the next bathers. The fourth step is effective in the reduction of any residual bacterial count that may be present at the end of the drying stage. The last three steps represent safeguards in case the first step is not carried to completion. Under careful operation, also, they may, perhaps, be made sufficiently reliable to warrant the omission of the disinfection stage; but this must be determined by further study.

The results of the numerous tests made to determine upon a suitable disinfectant for the purposes in view, indicate that a water soluble coal tar disinfectant is satisfactory for bathing suits, while disinfection with chlorine in any of its commercial forms (hypochlorites or solutions) represents a practical means of treatment for towels.

The phenol coefficient (with organic matter) of the commercial product studied in connection with the disinfection of bathing suits, may be taken as 1.87. Effective results are obtained through the use of a strength of solution of 1.5 per cent, with a contact period of 15 minutes, allowing one gallon of solution per suit for each lot of suits passed through the disinfecting vat or tank. At least six batches of suits may be treated under these conditions before the solution is spent. At present market prices, the cost of disinfectant per suit would be approximately 0.06 cent.

For the best results on a working scale, it appears that suits should be agitated in the disinfecting solution in order that the disinfectant may penetrate to every part of the suit. The 15-minute period proposed is considered the minimum time in which adequate disinfection may take place. An increase to 30 minutes or more would, in most cases, be entirely practicable, and should be insisted upon if it is found that consistently good results can not be obtained otherwise.

In the case of towels, a 15-minute contact period in a solution containing 300–400 parts per million available chlorine is sufficient. The slight bleaching action that accompanies the use of this strength of solution is a desirable feature. The cost of disinfection depends upon the form in which the chlorine is purchased; for the solution considered in the present studies, the cost would amount to about 0.05 cent per towel.

The results of samples taken in various local swimming pool laundries show that the greatest percentage removal of bacteria in the washing stage follows the use of hot water and soap. Further study, however, is needed to determine the advantage in this respect of washing over plain rinsing.

Plain rinsing in cold water is of value in not only cleansing the suit but in effecting a considerable reduction of the bacterial contamination. An 80 per cent reduction may be expected from two 5-minute rinses. The bulk of the dirt contained in the suit is washed out by the first rinse water; no appreciable advantage is to be gained by more than two rinsings.

A laundry method, consisting of rinsing and air-drying alone, which is sometimes met with in practice, represents an entirely inadequate form of treatment for bathing suits and towels.

Sun-drying appears to offer an effective means of securing practical sterility when used in conjunction with the previous stages of the laundering process.

Plain air-drying indoors, in the absence of direct sunlight, may be relied upon to make the final count satisfactorily low, provided the contamination, as measured by the count just prior to drying, is less than 1000. When this is not the case, however, this method of drying fails to cause a decrease in the contamination. On the contrary, it appears that the warm, moist air in the drying loft actually favors the growth of bacteria in the suits, the maximum counts being reached at that point where, under careless management, bathers are allowed to use the suits before they are entirely dry.

In view of this fact, bathers should be permitted to use only those suits that are ready for distribution from the storage shelves.

Even with high initial counts, hot-air drying is effective in removing about 80 per cent of the bacteria. It is believed that further study would be of value in determining whether, with higher temperatures and longer periods than those found in the experiments, practical sterility could not be secured.

Storage of suits subsequent to drying represents a further step in the removal of residual contamination, and is to be recommended as an additional safeguard.

Reviewing the more important conclusions reached in the present series of experiments, it is evident that each of the four factors of disinfection, washing, drying and storage, influences the final result to a variable degree and merits a special, detailed study. The condition of the raw suits and towels in different establishments will be found to vary greatly as to counts in the individual articles. The average counts obtained from large numbers of suits or towels will, however, not differ widely, and, for the conditions under which the present tests were carried out, were found to be as recorded in Table No. 12.

TABLE No. 12.

Typical Bacterial Counts Obtained from Bathing Suits and Towels, Using Technic of Sampling Developed by the Authors.

Description of article	Counts on Agar: 24 hours at 37 degrees C.		
	Average	Maximum	Minimum
Raw suits	45,000	120,000	3,000
Raw towels	148,000	200,000	80,000
Laundered suits and towels:*			
Best laundry methods	30	100	0
Fair laundry methods	500	1,000	100
Inadequate laundry methods	4,000	Innumerable	1,000

*On shelves, ready to be delivered to bathers.

The figures given for laundered suits and towels are based upon the results of the entire study. The recorded bacterial counts were actually obtained in establishments whose laundry methods obviously corresponded to the three classes listed in the table. In addition to being of interest in a comparison of the final results to be expected of laundries where the work is carried on with different degrees of thoroughness, the counts obtained in this connection constitute a satisfactory check upon the technic of sampling, and demonstrate its applicability in the control of the laundering of bathing suits and towels.

TABLE No. 13.

Suggested Outlines of Laundry Methods Adapted to Meet a Standard of Practical Sterility in Bathing Suits and Towels.

Article	Disinfection	Washing	Drying	Storage
Bathing suits	1.5%-2% solution water-soluble coal tar disinfectant. Minimum contact 15 minutes. Disinfectant extracted and returned to tank.	Hot water and soap, 15 minutes; 2 rinses cold water, 5 minutes each.	Sun-drying 6 hours; or Loft-drying, 24 hours.	None. Not less than 6 hours.
Bathing suits	The same	2 rinses hot water, 10 minutes each.	Hot-air drying, 1 hour at 250-300° F.	None.
Bathing suits	No disinfection	Hot water and soap, 20 minutes; 2 rinses hot water, 5 minutes each.	Hot-air drying, 1 hour at 250-300° F.	Not less than 6 hours.
Towels	By chlorine in some commercial form. Available chlorine 300-400 parts per million; 15-minutes contact.	Hot water and soap, 20 minutes; 2 rinses hot water, 5 minutes each.	Sun-drying, loft-drying, or hot-air drying as above.	None.

MONTHLY BULLETIN
CALIFORNIA STATE BOARD OF HEALTH

Devoted to the Prevention of Sickness and Death

Entered as second-class matter, August 15, 1905, at the post office at Sacramento, California, under the Act of Congress of July 16, 1894. Acceptance for mailing at the special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 27, 1918.

Sent free, on request, to any citizen of California.

WILFRED H. KELLOGG, M.D., Secretary . . . Executive Officer
GUY P. JONES, Assistant to the Secretary . . . . . . Editor

If anyone doubts the enthusiasm or intelligence of California health officers, he should have been at the eleventh annual conference of state and municipal health officials at Riverside October 20–24. The interesting papers and the intelligent discussions indicate clearly that California's interest in public health is paramount. This interest was not confined to the medical men, but was shared by public health nurses, social service workers, and many laymen. Every agency that works for the public good was represented at this conference, and the active participations in the discussions proved that the people of California place first emphasis upon the health of the community.

Many of the communicable diseases that during the past few years have not been unusually prevalent have started, during the fall months, upon a marked increase. This is particularly true of smallpox, diphtheria, and rabies. Since the control of diphtheria is based upon well-known and standard methods of procedure, there is no excuse for any community not to take the usual methods of control. Any community that objects to the swabbing of children's throats and to the basing of findings upon the work of the bacteriological laboratory can blame only itself for an outbreak of this disease. Similarly, any community that refuses to have its children vaccinated for smallpox can blame only itself for a catastrophe of this sort that may suddenly make its appearance. As for rabies, it may be stated that not since 1915, when the disease was widely prevalent in Modoc and Lassen counties, has there been any large number of cases, until October of this year. The disease is most prevalent now in Tulare and Fresno counties. The health officers of this section of the state, in co-operation with the State Board of Health, have taken steps for the control of domestic animals, especially dogs, in these counties. Under the enforcement of strict regulations pertaining to the movements of such animals it is anticipated that the outbreak will soon be brought within bounds.

The United States Department of Agriculture has gone to considerable trouble to advise housewives that egg substitutes are of no aid in baking. Most of these egg substitutes consist essentially of starch or powdered cereal products, such as wheat flour, sometimes artificially colored yellow to imitate the appearance of eggs. The consumer generally pays about six cents an ounce, or at the rate of one dollar per pound for this misleading article. It is generally claimed that each package will take the place of from twelve to forty-eight eggs. Unfortunately, they do not perform the work of eggs in baking or cooking. Housewives who purchase these egg substitutes are merely making themselves victims of misrepresentation.

Drainage from ice boxes is said to be one of the most frequently overlooked breeding places for mosquitoes. In many rural districts the drainage from refrigerators is allowed to run onto the ground where it collects in small pools in which mosquito larvæ are frequently found. Very often the waste water from ice boxes is allowed to collect underneath a porch or dwelling house and because of the fact that it is undisturbed it makes an ideal breeding place for malaria-bearing mosquitoes.

One would naturally think that old bones have no nutritive value, but Prof. M. E. Jaffa, consulting nutrition expert of the State Board of Health, has advised the state hospitals and other state institutions to be careful in saving all old bones in order that they may be ground up and fed to the poultry. Bone meal is not only good for poultry but it can also be used advantageously for swine, as the mineral ash in old bones is valuable in hog food. In his communications to the various state hospitals Prof. Jaffa has advised that all bones be cooked for a sufficient length of time so that there will be left, upon removal from the soup kettle, practically no adhering meat. He advises that the soup bones then be cleaned, thoroughly dried and ground, stating that the resulting meal will be in every way as good as the commercial article costing at retail between sixty and seventy dollars a ton.

"The maintenance of the growth of the individual is the chief requirement of the healthy growth of the state."

Communicable Disease

FRANK L. KELLY, M.D., Director
Bureau of Communicable Diseases.

INVESTIGATION OF FIVE CASES OF BOTULINUS POISONING AT COLUSA, SEPTEMBER 30, 1919.

By FRANK L. KELLY, M.D.

On September 30 I proceeded to Colusa to investigate five cases of botulinus poisoning reported by Dr. Rathbun.

I visited the two patients still ill and talked with the one who had recovered. Two patients had already died.

From the three patients and from Dr. Rathbun the following information was obtained:

Dr. Rathbun was called to see two patients, Frank Kearney and Jack Triplett, at Stonyford, about 40 miles west of Colusa, on Sunday, September 14. He found two men suffering from a paralysis of the throat muscles and with disturbances of vision. The men were moved to Colusa and on September 16 three more, Cash Martain, Andrew O'Leary and Denny O'Leary, were taken with the same symptoms. Kearney died on September 21 and Triplett on September 22.

Martain and Andrew O'Leary were still sick on September 30 and Denny O'Leary had completely recovered after slight disturbances of vision and some paralysis of his throat muscles.

The symptoms of all five cases were the same, except for degree of severity; all had disturbances of vision with diplopia, and one, Martain, had a complete ptosis of both lids. All had a paralysis of the muscles of the throat ranging from slight disturbance in the case of Denny O'Leary to complete paralysis in the other four, none of whom could either swallow or talk. Most of the patients had had some fever, going as high as 102.6 degrees in the case of Andrew O'Leary. There had been rapid pulse and respiration at times in all of the four cases that had been severely sick. The reflexes varied at different times, being increased at one time and diminished at another. Two of the cases had shown signs of a slight left sided hemiplegia and muscular weakness in all.

The two patients that died, died of cardiac failure. All the cases presented the typical picture of bulbar paralysis, and Dr. Rathbun rightfully concluded that he was dealing with botulinus poisoning.

Dr. Rathbun had obtained the following information regarding the source of the disease: Two of the men, Kearney and Triplett, lived on the Triplett ranch by themselves. They decided to have a big barbecue, and as no liquid refreshment with sufficient "kick" in it could be obtained, they decided to make some of their own. They put a lot of canned fruit and canned tomatoes, some of which was three or four years old and showed evidences of decomposition, into an old pickle barrel, added water and let it stand. They sampled this mixture on Thursday, September 11, and found it so satisfactory that they decided to have in several of their friends for a little poker game and to pass judgment on the drink before the big barbecue. On Saturday, September 13, the poker party was held and a large quantity of the "booze" was consumed. However, Triplett and Kearney had been sampling it pretty strenuously since the Thursday before and became ill on Sunday, September 14. The two O'Leary boys and Martain were taken sick on Tuesday, September 16. One, Denny O'Leary, had been taken severely to task by his wife on his return home on Sunday morning following the party and she had given him large doses of physic, which probably accounts for the mildness of his symptoms. There was another guest at the party who has not been located; he was a stranger to the three men still alive, but one thought his name was Chas. Anderson. I am endeavoring to locate this man.

A small amount of the "booze" was obtained and brought to the laboratory. After centrifuging, the sediment was planted into deep glucose agar and glucose broth under anaerobic conditions. Ten cubic centimeters of the supernatant fluid was injected into a Guinea pig and 10 cubic centimeters boiled and injected into another pig.

Parasitology.

C. A. Kofoid, Consulting Parasitologist.

Summary of Examinations Made in the Division of Parasitology During August, 1919.

	Positive	Negative	Total
Examinations for intestinal worms—			
Miscellaneous		39	39
Trichuris trichiura	9		9
Ascaris lumbricoides	8		8
Hookworm	4		4
Clonorchis sinensis	1		1
Totals	22	39	61
Examinations for intestinal protozoa—			
Miscellaneous		40	40
Entamoeba coli	10		10
Entamoeba dysenteriæ	2		2
Giardia intestinalis	1		1
Totals	13	40	53
Total examinations	35	79	114

The histories of the two amoebic dysentery cases reported above indicate that the infections were of foreign origin. One of the individuals had resided in Tahiti for a number of years and had just recently come to California. The other was a native of one of the Asiatic countries.

Morbidity for August, 1919, by weeks.

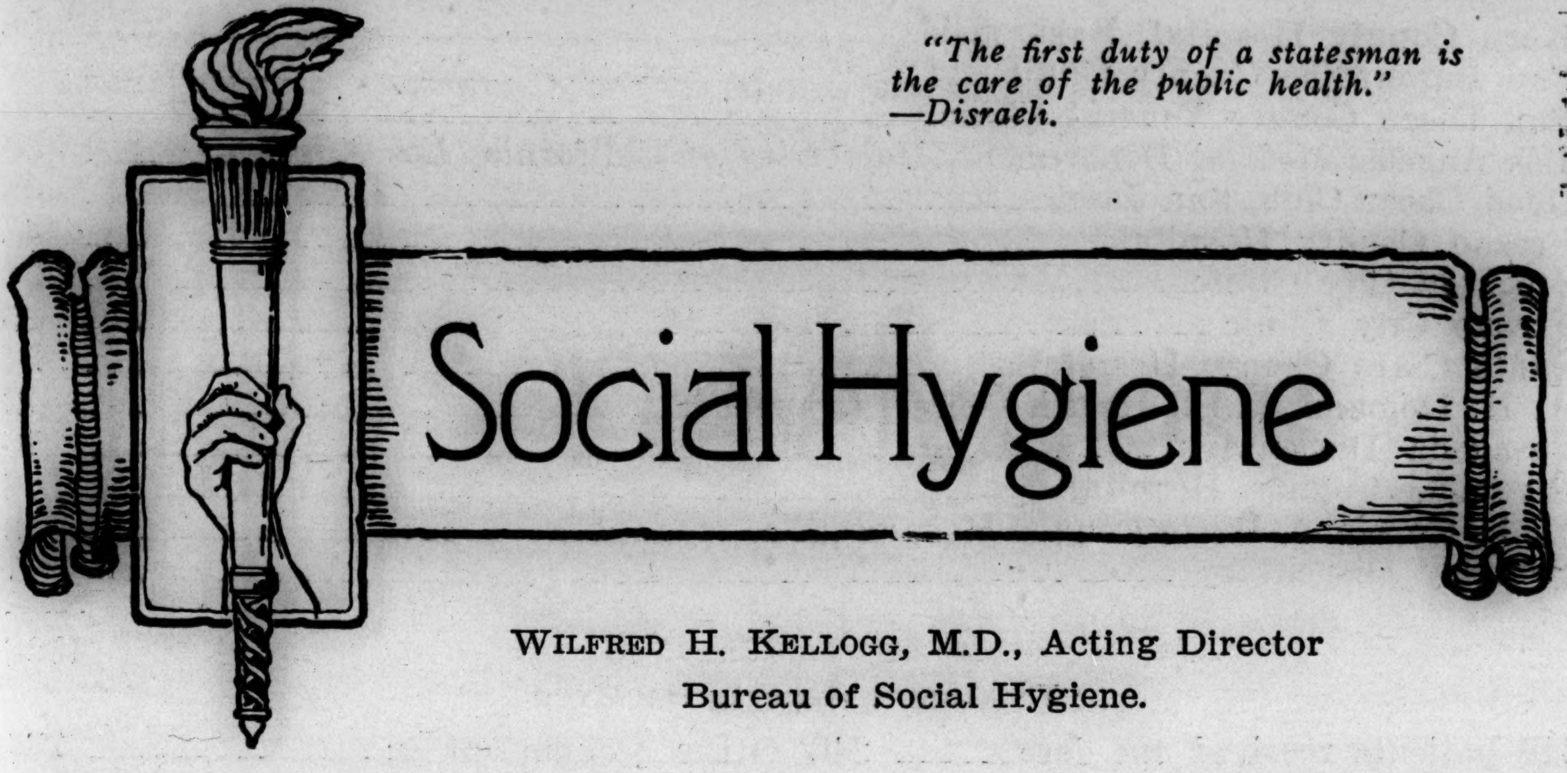
L. E. Ross, Morbidity Statistician.

	Weeks ending				Total August, 1919	Total August, 1918
	Aug. 9	Aug. 16	Aug. 23	Aug. 30		
Anthrax	-------	-------	1	-------	1	------
Beri-beri	-------	-------	-------	-------	-------	1
Cerebrospinal meningitis	-------	2	1	1	4	17
Chickenpox	32	25	35	24	116	61
Cholera, Asiatic	-------	-------	-------	-------	-------	------
Dengue	-------	-------	-------	-------	-------	------
Diphtheria	48	40	33	28	149	187
Dysentery	2	3	2	2	9	8
Encephalitis, lethargic	-------	1	1	1	3	------
Erysipelas	3	7	3	5	18	21
German measles	2	3	2	-------	7	11
Glanders	-------	-------	-------	-------	-------	------
Gonococcus infection	136	67	128	79	410	560
Hookworm	-------	-------	-------	-------	-------	------
Influenza	17	8	15	22	62	------
Leprosy	-------	1	-------	-------	1	------
Malaria	23	40	30	40	133	80
Measles	18	13	16	24	71	229
Mumps	37	28	23	26	114	403
Opthalmia neonatorum	-------	-------	-------	-------	-------	2
Paratyphoid	-------	1	-------	1	2	1
Pellagra	-------	2	-------	-------	2	2
Plague	-------	-------	-------	-------	-------	------
Pneumonia	13	9	22	12	56	139
Poliomyelitis	2	-------	-------	2	4	10
Rabies	-------	-------	-------	-------	-------	------
Rocky Mountain spotted fever	-------	-------	-------	-------	-------	------
Scarlet fever	24	30	39	25	118	136
Smallpox	27	30	38	31	126	46
Syphilis	97	136	117	76	426	290
Tetanus	-------	-------	1	5	6	3
Trachoma	2	-------	2	1	5	4
Trichinosis	-------	-------	-------	-------	-------	------
Tuberculosis	137	114	131	120	502	698
Typhoid fever	28	17	21	28	94	127
Typhus fever	-------	-------	-------	1	1	------
Whooping cough	14	27	17	15	73	203
Yellow fever	-------	-------	-------	-------	-------	------
Totals	662	604	678	569	2,513	3,239

Germ diseases kill off more people than the deadliest wars, says the United States Public Health Service. In 1917 pneumonia and tuberculosis killed 223,000 Americans, more than seven times the number killed in action in France.

Heart diseases caused more deaths in 1917 than any other ailment (115,337), says the United States Public Health Service. Right living would materially reduce this. Don't wait for the disease to develop before you see your physician.

"The first duty of a statesman is the care of the public health."
—Disraeli.



Social Hygiene

Wilfred H. Kellogg, M.D., Acting Director
Bureau of Social Hygiene.

During the month of August each clinic was visited by a representative of the Bureau. The final adjustment of the subsidies was accomplished. In some places, the municipal or county authorities provided for the continuation of the work; in other localities, where the public treasuries were too low to admit the appropriation of funds for the venereal disease clinic, the Red Cross met the emergency to keep the clinics running. In one or two towns subscriptions were taken to enable certain workers to be retained.

The number of new patients admitted to the various clinics during August compares favorably with other months, even though this was the vacation period, which allowed numbers of individuals to absent themselves in order to follow the fruit picking. The social service workers brought two hundred eleven new cases into clinic for treatment during August. This number does not include those cases which were suspected of infection and proved negative after careful examination. All physicians realize the difficulties involved in keeping infected individuals under treatment for sufficient time to permit of their being cured. There is no class of patients in such dire need of regular treatment which so neglects itself as that infected with venereal disease. It requires constant attention and tactful advice from the social service workers to keep these patients coming to the clinics, also many home visits and innumerable explanations.

There were one hundred nine patients who were persuaded to continue treatment during the past month. Sometimes, to accomplish this purpose, the social service worker must have the faculties of a detective in order that she may discover the correct home address.

The following report of the arsphenamine distribution will show the increase in free treatments for syphilis; in August, 1918, 527 ampoules were distributed, as against 1396 in August, 1919.

Arsenobenzol Distributed by the Bureau During August, 1919.

Los Angeles County Hospital	250
Los Angeles Health Department	200
San Francisco Health Department	150
San Francisco Hospital	150
University of California Hospital, San Francisco	74
Boyle Avenue Dispensary, Los Angeles	60
Stanford University Clinic, San Francisco	50
Mission Valley Hospital, San Diego	50

Kern County Hospital, Bakersfield	50
San Bernardino County Clinic	50
San Diego County Veneral Clinic	50
Los Angeles Medical Department, University of California, Los Angeles	50
Good Cheer Club, San Jose	48
Fresno County Hospital	48
Stockton City Clinic	36
Fresno City Clinic	25
Santa Clara County Hospital	24
A. H. Domann, M.D., Health Officer, Orange	12
Pasadena Dispensary	10
Riverside County Hospital	6
M. L. Copeland, Butte County Hospital	2
Berkeley Dispensary	1
	1396

Treatment Reports Received.

246	patients received one dose	246
183	patients received two doses	366
85	patients received three doses	255
53	patients received four doses	212
19	patients received five doses	95
9	patients received six doses	54
4	patients received seven doses	28
1	patient received eight doses	8
600		1264
	Ampoules wasted	16
		1280

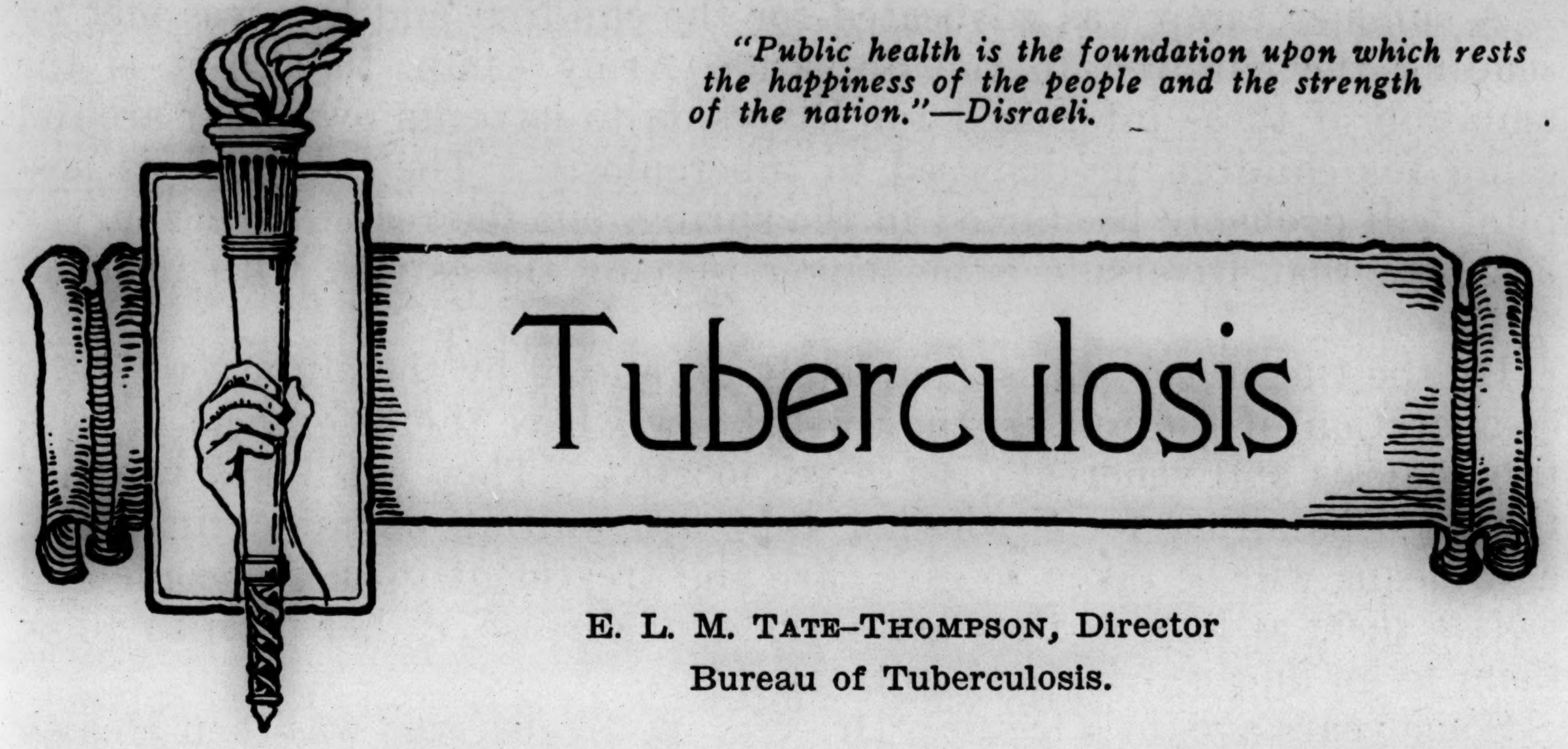
Other occupations	234
Housewives	123
Laborers	117
Prostitutes	47
No occupations	40
Students	39
	600
Males	321
Females	279
	600

Patients Treated.

Los Angeles County Hospital	91
San Francisco Hospital	79
San Francisco Health Department Clinic	68
Stanford University Clinic, San Francisco	49
Temple Block Clinic, Los Angeles	47
Boyle Avenue Dispensary, Los Angeles	37
Selwyn Emmett Graves Dispensary, Los Angeles	31
Good Cheer Club Clinic, San Jose	24
Fresno County Hospital	21
San Diego County Venereal Clinic	20
University of California Hospital, San Francisco	18
Los Feliz Hospital, Los Angeles	17
Los Angeles Juvenile Hospital	15
Stockton City Clinic	13
San Bernardino County Clinic	12
Kern County Hospital	9
Pasadena Dispensary	7
Sacramento County Hospital	6
San Francisco Polyclinic	6
Santa Barbara Cottage Hospital	6
Mission Valley Hospital, San Diego	6
Los Angeles East Side Jail	4
Fresno City Clinic	4
Oakland College of Medicine and Surgery	4
Orange County Hospital	2
Sacramento Hall of Justice	2
Riverside County Hospital	1
Berkeley Dispensary	1
	600

Total number of ampoules distributed		12,962
Total number of treatment cards received	11,944	
Total number of treatment cards distributed and not returned	1,018	
	12,962	

"Public health is the foundation upon which rests the happiness of the people and the strength of the nation."—Disraeli.



Tuberculosis

E. L. M. Tate-Thompson, Director
Bureau of Tuberculosis.

During the month of May the Bureau of Tuberculosis visited Riverside on a program for the prevention of tuberculosis. A survey was made of the city and county by the Bureau's field worker, Miss Linda Mitschke. The Director held several meetings with the supervisors from Orange and Riverside counties with reference to the establishment of a joint hospital. Meetings were also held with the Red Cross Chapter, the City Home League and the County Medical Society. It was rather difficult at that time to know whether the vaccination had taken or not, but it has been a complete demonstration of what co-operation will do if all people interested in public health will work together.

The city of Riverside in the last three and one-half years has had 183 deaths from tuberculosis, while the county of Riverside in the past year has had 152 deaths.

The city of Riverside, Sherman School and March Field reported from October, 1918 to December, 1918, 2910 cases of influenza, so that there is no reason to believe that there will be a material increase in the number of cases of tuberculosis in Riverside.

Riverside, like a number of counties in Southern California, carries a higher death rate on account of its climate. Banning and Beaumont have tuberculosis sanatoria; there is also the Sherman Indian School, March Field and an Indian population that makes tuberculosis an acute problem both in the city and county. Because the figures were so high, and that all of the agencies we wished to co-operate with might know that our figures were correct, all of the statistics that were compiled were obtained from the Bureau of Vital Statistics in the State Board of Health. There was no hearsay about any case that was quoted; it was investigated.

The need in Riverside for a general dispensary to which patients could be referred has evidenced itself, not only for tuberculosis but for other cases of sickness. It was decided to ask the co-operation of the Bureau of Venereal Diseases to assist in the organizing of clinics. The help that the Red Cross could give was also appreciated. The result has been that the recommendations made by the Bureau of Tuberculosis have been realized this last month, when the supervisors made the appropriation for a county nurse; and when the city made a small appropriation towards the nursing service and the Red Cross, Bureau of Venereal Diseases made adequate appropriations to carry on the nursing service of the city. The Bureau of Venereal Diseases is also to equip the clinic.

A summer camp was advocated for the children and this was met by sending the children to the Salvation Army camp, though it is the ambition of those interested for Riverside to have its own year-around camp for children predisposed to tuberculosis. The tuberculosis hospital will probably be started in the spring, but the result of the survey has been that Riverside is no longer playing the ostrich with its head in the sand.

By the time the work is completely organized by the clinics, with the co-operation of the nurses, they will know where their contacts in both tuberculosis and venereal disease are located. They will know whether they are handling food, whether they are waiting on tables in cafes; and means will be taken to give care and treatment to these people and isolate them as long as they are carriers of disease, rather than to allow them to go uncared for and untreated.

Some years ago, in a lecture, Dr. Wm. E. Evans, who was then Health Commissioner of Chicago, made the statement that every country has tuberculosis just in proportion to their just deserts. He explained this further by adding: a community that refuses to recognize tuberculosis must expect to have carriers in restaurants, must expect to have children coming from tuberculous homes sitting next to your child in the public schools. But Riverside has already created some good machinery. They have a school nurse and now are to establish an open air school for children who need the extra care and whose attendance is irregular in school.

The County Medical Society has already signified a willingness to help with the clinic. Some of the clinic findings are as follows:

Twelve white families with 38 children suspected of tuberculosis.

Seven Mexican families with 24 children suspected of tuberculosis.

Three colored families with 14 children suspected of tuberculosis.

These twenty-two families are either receiving county or state aid or free services from physicians.

Seven children have positive pulmonary tuberculosis, four have tubercular glands and three spinal curvatures, and one case of intestinal tuberculosis. In fifteen of these families some member either has tuberculosis or died of it.

With the machinery created in Riverside by these various agencies, and the completion of the tuberculosis hospital, Riverside citizens can indeed point with pride to the establishment of these as a part of the progressiveness of their city and county. Other surveys will be made during the year of various counties in the state where the tuberculosis death rate is appallingly high.

The Director has spent considerable time working with the representatives of the Southwestern Conference on the program, and meetings have been held at Los Angeles during the past month with the state and local tuberculosis associations; and by the first of the year the county of Los Angeles will be organized as well as the city.

A meeting was held at Red Bluff with the supervisors from Tehama, Trinity, Shasta, Modoc and Lassen counties to consider the advisability of a joint county hospital for that section of the state. More counties will be asked to join, and an effort will be made to duplicate Weimar on a smaller scale.

A meeting was held at Santa Rosa early in the month, and a public health committee organized. The supervisors were also visited and asked to take over the county nurse, who has been paid by the tuberculosis committee.

One of the most important conferences held in San Francisco for some time, was a joint conference of officers from the Public Health Service, the Army, the Red Cross, War Camp Community Service, Reconstruction Board and representatives from the Vocational Training and Bureau of Tuberculosis, to consider the advisability and urge the necessity of the establishment of a branch office in San Francisco of the War Risk Insurance Bureau. All agencies working with soldiers at present are handicapped by the fact that soldiers entitled to compensation are obliged to wait months in order to receive an answer from Washington. This matter is a serious one, and one we have got to press. A telegram has been received from Senator Phelan, in which he states that Congress is now considering the establishment of a branch office in various places, and that a copy of the Director's telegram is being forwarded to the committee and that he hopes for favorable action. If this can be accomplished, thousands of our California boys who are waiting for their compensation will have an opportunity to begin to make some plans for themselves, which they are unable to do at present.

Some of the boys with whom we communicated in June are about to leave the Base Hospital at Palo Alto and enter the Agricultural School at Davis. If the boys who have delayed their entrance into the sanatoriums could see what has been done for the men who responded to our first letter, they would not wait longer.

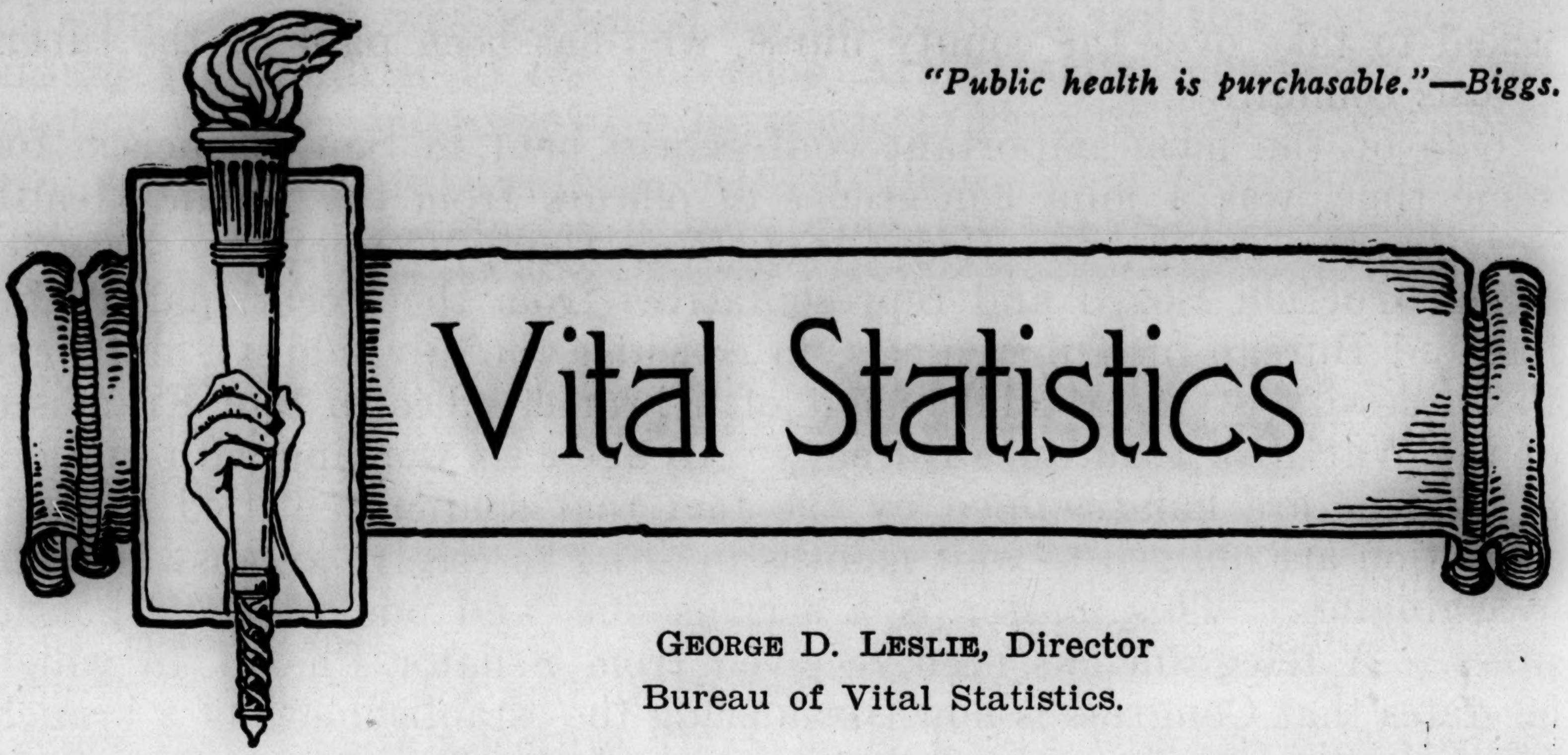
Better systems of co-operation are being worked out between various departments, and if the establishment of the War Risk Bureau in San Francisco becomes a reality very many of the troubles of various organizations will be eliminated.

A decayed tooth is far more dangerous to the health than a fly in the soup, says the United States Public Health Service. Visit the dentist regularly. Keep the teeth clean.

The kitchen is the most important room in the house from a health standpoint, says the United States Public Health Service. Keep everything about it and every one in it scrupulously clean.

Beauty is more than skin deep, according to the United States Public Health Service. Natural beauty is usually a sign of health that comes from keeping the body clean and getting plenty of outdoor exercise.

"Public health is purchasable."—Biggs.



Vital Statistics

George D. Leslie, Director
Bureau of Vital Statistics.

Births, Deaths and Marriages for July.

State, Totals and Annual Rates. The following table shows for California as a whole, the birth, death and marriage totals for the current month of the year to date in comparison with corresponding figures for last year, as well as the annual rates per 1000 population represented by the totals for the current month and the year to date. The rates are based on an estimated midyear population of 3,221,301 for California in 1919, the estimate having been made by the United States Census Bureau method with slight modifications.

Birth, Death and Marriage Totals, with Annual Rate per 1000 Population, for Current Month and Year to Date, for California: July.

Month or period	Total		Annual rate per 1,000 population, 1919
	1919	1918	
July—			
Births	4,409	4,856	16.1
Deaths	3,209	3,150	11.7
Marriages	3,686	3,023	13.5
January to July—			
Births	30,951	31,876	18.0
Deaths	29,295	25,375	15.7
Marriages	20,507	19,042	11.0

The above totals show a slight increase in deaths for July, 1919, in comparison with the same month for 1918, a considerable increase in marriages, and a decrease in deaths.

Also, a comparison of the first six months of 1919 with the first six months of 1918 shows an increase in both deaths and marriages for the current year, and a decrease in births.

Length of Residence. The length of residence in California for the 3,209 decedents in July was as follows: Unuder 1 year, 202, or 6.3 per cent; 1 to 9 years, 584, or 18.2 per cent; 10 years and over, 1395, or 43.5 per cent; life, 883, or 27.5 per cent; and unknown, 145, or 4.52 per cent.

For residents of the 70 cities of 2500 population and over, in 1910, there were 81 births and 109 deaths, which occurred in registration districts other than the city of residence.

County Marriage Totals. The counties showing the highest marriage totals for the month were as follows: Los Angeles, 834; San Francisco, 775; Alameda, 339; Santa Clara, 141; Orange, 137; San Diego, 131; Sacramento, 124; Fresno, 103; San Bernardino, 99; San Joaquin, 91; Marin, 75; Riverside, 58; Santa Cruz, 56; Santa Barbara, 44; San Mateo, 43; and Kern, 42.

County Birth and Death Totals. Exclusive of stillbirths in both cases, the birth and death totals for the month were as follows for the leading counties, arranged in decreasing order of birth registration:

County	Births	Deaths	County	Births	Deaths
Los Angeles	1,072	845	Santa Clara	124	106
San Francisco	658	526	Contra Costa	95	61
Alameda	419	285	Kern	89	38
Fresno	203	105	Orange	88	66
Sacramento	158	97	Stanislaus	80	58
San Diego	145	97	Tulare	69	44
San Joaquin	140	107	Riverside	67	43
San Bernardino	125	87	Sonoma	64	75

City Birth and Death Totals. Birth and death totals, exclusive of stillbirths, are presented similarly for the principal California cities below:

City	Births	Deaths	City	Births	Deaths
Los Angeles	710	514	Pasadena	55	39
San Francisco	658	526	Berkeley	53	33
Oakland	270	177	San Jose	50	30
Sacramento	121	73	Vallejo	46	15
San Diego	100	70	San Bernardino	38	28
Stockton	81	68	Santa Barbara	37	20
Fresno	75	29	Bakersfield	32	17
Long Beach	59	58	Riverside	31	23

Causes of Death. The following table shows the classification of deaths in California for the current month, in comparison with the preceding month:

Deaths from Certain Principal Causes, with Proportion per 1000 Total Deaths, for Current and Preceding Month, for California: July.

Cause of death	Deaths July, 1919	Population per 1,000	
		July	June
All causes	3,209	1,000.0	1,000.0
Typhoid fever	23	7.2	4.5
Malarial fever	1	.3	.9
Smallpox	----------	----------	----------
Measles	----------	----------	----------
Scarlet fever	2	.6	.6
Whooping cough	8	2.5	1.5
Diphtheria and croup	25	7.8	5.9
Influenza	16	4.9	16.5
Other epidemic diseases	9	2.8	6.6
Tuberculosis of lungs	388	121.0	122.0
Tuberculosis of other organs	63	19.6	18.6
Syphilis and gonorrhea	25	7.8	6.2
Cancer	305	95.0	87.5
Other general diseases	112	34.9	36.3
Meningitis	18	5.6	7.4
Other diseases of nervous system	291	90.7	96.2
Diseases of circulatory system	585	182.3	170.0
Pneumonia and broncho-pneumonia	121	37.7	41.1
Other diseases of respiratory system	45	14.2	15.0
Diarrhea and enteritis, under 2 years	113	35.2	36.9
Diarrhea and enteritis, 2 years and over	38	11.8	12.6
Other diseases of digestive system	179	55.8	54.5
Bright's disease and nephritis	196	61.1	62.0
Childbirth	37	11.5	9.5
Diseases of early infancy	132	41.1	38.4
Suicide	94	29.3	24.9
Other violence	271	84.4	83.6
All other causes	112	34.9	40.8

In July there were 585 deaths, or 18.2 per cent, from diseases of the circulatory system; and 451, or 14.0 per cent, from the various forms of tuberculosis. Heart disease was the leading cause of deaths for the month.

The deaths from the three leading epidemic diseases were distributed by counties as follows:

Diphtheria.		*Typhoid Fever.*		*Influenza.*	
Alameda	7	Alameda	4	Alameda	1
Fresno	2	Contra Costa	1	Contra Costa	1
Humboldt	1	Fresno	1	Fresno	2
Los Angeles	4	Imperial	1	Humboldt	1
Riverside	1	Los Angeles	5	Kern	2
Sacramento	1	Riverside	2	San Diego	1
San Diego	1	Sacramento	1	San Francisco	1
San Francisco	3	San Diego	1	San Joaquin	1
San Joaquin	1	San Francisco	2	Santa Barbara	1
Santa Barbara	1	San Joaquin	2	Stanislaus	4
Sierra	1	Stanislaus	2	Tuolumne	1
Sonoma	1	Ventura	1		
Tulare	1				
	25		23		16

Sex, Race and Nativity. The proportion of the sexes among the 3209 decedents in July was: Male, 1861, or 58 per cent; and female, 1348, or 42 per cent.

The race distribution of decedents was: White, 3025, or 94.2 per cent; Japanese, 68; Chinese, 54; Negro, 51; and Indian, 11.

The 3025 white decedents were classified by nativity as follows: California, 812, or 26.8 per cent; other states, 1203, or 39.8 per cent; foreign, 935, or 30.9 per cent; and unknown, 75, or 2.5 per cent.

Infant Mortality. There were 328 deaths for children under 1 year, which were distributed by age in months as follows: Under 1 month, 155, or 47.2 per cent; 1 to 2 months, 52, or 15.9 per cent; 3 to 5 months, 58, or 17.7 per cent; and 6 to 11 months, 63, or 19.2 per cent.

In certain cities the deaths under 1 year were as follows: Los Angeles, 60; San Francisco, 44; and Oakland, 10.

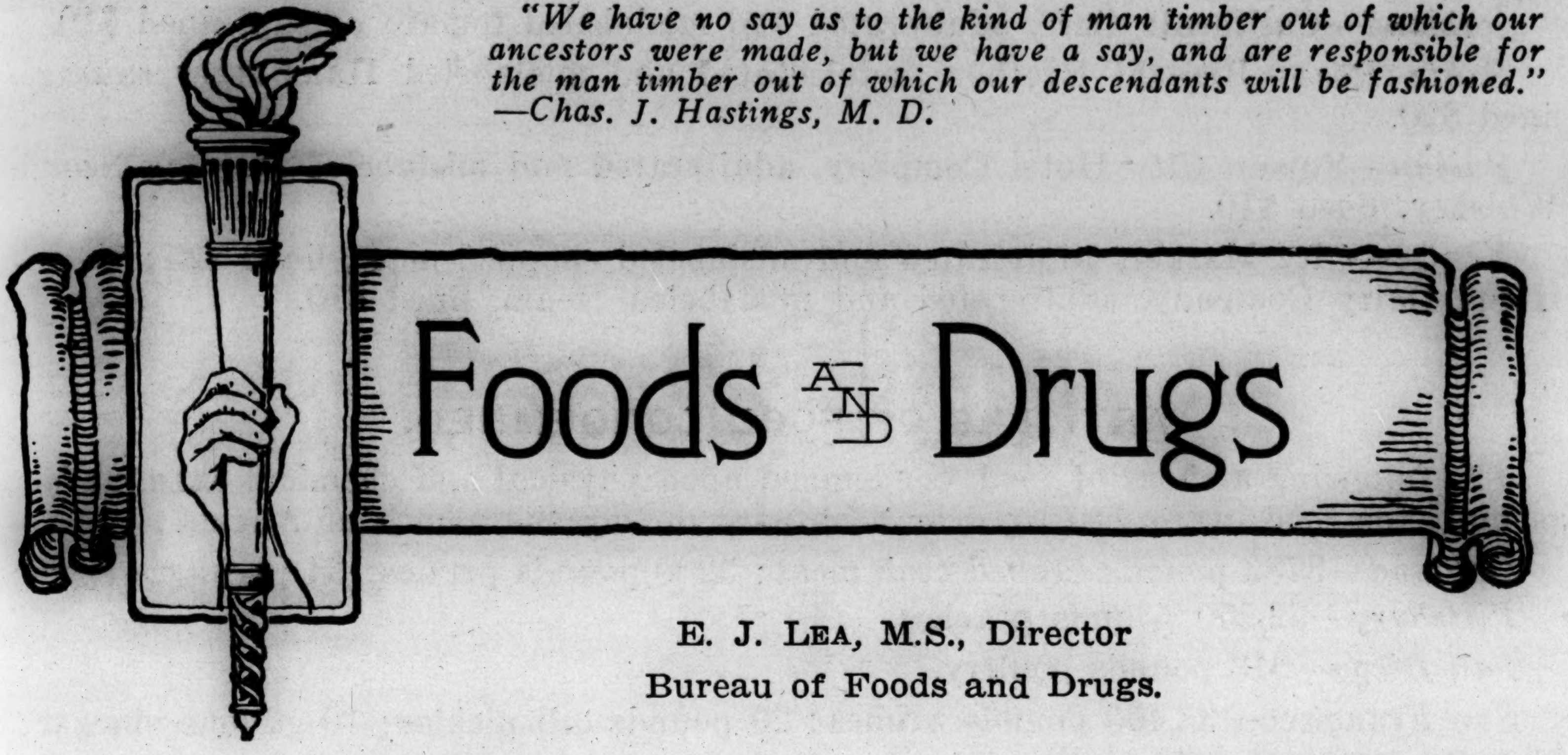
The 328 deaths under 1 year, in comparison with the 4409 live births reported for the month, show an infant mortality ratio of 74 per 1000 births.

Cultivate the habit of walking with head up and the shoulders thrown back. It is cheaper and better than bottled tonics, says the United States Public Health Service.

Thousands of children are killed every year because parents say, "They will have it anyway," and permit the little ones to expose themselves to whooping cough, measles and scarlet fever, says the United States Public Health Service.

Industrial accidents killed 3400 persons and seriously injured 50,000 in the State of Pennsylvania in 1918, according to reports reaching the United States Public Health Service. Most of such accidents are preventable; many the result of carelessness. Safety First.

> *"We have no say as to the kind of man timber out of which our ancestors were made, but we have a say, and are responsible for the man timber out of which our descendants will be fashioned."*
> *—Chas. J. Hastings, M. D.*



Foods AND Drugs

E. J. LEA, M.S., Director
Bureau of Foods and Drugs.

A total of one hundred samples were received at the laboratory for examination and analysis during the month of August.

Sixty-six official samples collected by the inspectors consisted of beverages, butter, cheese, chocolate, condiments, cream, eggs, fish, fruit, honey, ice cream, jam, jelly, maple sugar, meat, milk, olive oil, pastes, pepper, syrup, vegetables, and vinegar, among the food samples; and camphorated oil, citrate of magnesia, sweet oil and tincture of iodine among the drug samples.

Twenty-seven unofficial samples consisted of condiments, frozen eggs, fish, fruit, mince meat, noodles, vegetables; 1 chicken crop.

Seven samples were received from state institutions, consisting of butter, flour, fruit and hay.

CASES REFERRED TO DISTRICT ATTORNEYS.

The following cases were referred to the district attorneys for prosecution at the August meeting of the State Board of Health:

Calexico—Adolph Kessling, pork sausages; chopped meat.

Oakland—M. Rampone, tomato paste; Piedmont Cakery, butter.

Los Angeles—California Baker's Specialty Company, imitation baker's jelly; orangerie paste; Phillips & Leonard, pure lemon extract; Reitz Pharmacy, camphorated oil; Fred Margaretten, corned beef and cabbage; M. Gluck, corned beef and cabbage; Fred Margaretten, New England boiled dinner; William Wannowsky, Duffy's solution.

San Francisco—Joe Buckwald, incubator eggs; New Bay City Market, chopped meat.

CONVICTIONS UNDER FOOD AND DRUGS ACT REPORTED DURING AUGUST, 1919.

Artesia—Regal Drug Store, acetyl-salicylic acid, not conforming to standard, fined $25.

Dixon—T. Egusa and Y. Araishi, adulterated and mislabeled tomatoes, fined $100.

Long Beach—Curtis Corporation, adulterated and mislabeled "Curtisola," fined $50.

Los Angeles—Aliso Pharmacy, citrate of magnesia, below standard, fined $10; camphorated oil, below standard, fined $10; D. F. Ownbey, adulterated and mislabeled apple jelly, fined $20; Hurth's Bakery, adulterated and mislabeled walnut meats, fined $25; Richert Brothers, adulterated and mislabeled extract lemon, other materials substituted, fined $10; adulterated and mislabeled extract lemon, fined $10; adulterated and mislabeled extract ginger, fined $10; Weaver's Pharmacy, adulterated and mislabeled camphorated oil, fined $25 (suspended).

Oakland—California Cafe, adulterated and mislabeled tomato catsup, fined $10.

Santa Rosa—Bianchi Brothers, adulterated and mislabeled Hamburger sausage, fined $20.

Suisun—Suisun City Hotel Company, adulterated and mislabeled Dewar's Scotch Whiskey, fined $10.

Venice—City Market, adulterated and mislabeled chopped meat, fined $25; Venice Home Dairy Company, adulterated and mislabeled cream, fined $10.

ARTICLES OF FOOD CONDEMNED.

The following articles of food, condemned upon physical and chemical examination as unfit for food, were destroyed or denatured during the month of August:

Oakland—3782 pounds canned crab meat; 3200 pounds prunes; 34 packages eggoe.

Pittsburg—52,250 pounds peaches.

San Diego—913 pounds poultry.

San Francisco—38,455 pounds prunes; 20 pounds dill pickles; 10 gallons vinegar; 44 cases tomatoes with chili.

Santa Rosa—25 pounds spinach (canned); 90 pounds peaches (canned).

Suisun—8 pounds shelled peanuts; 40 pounds prunes.

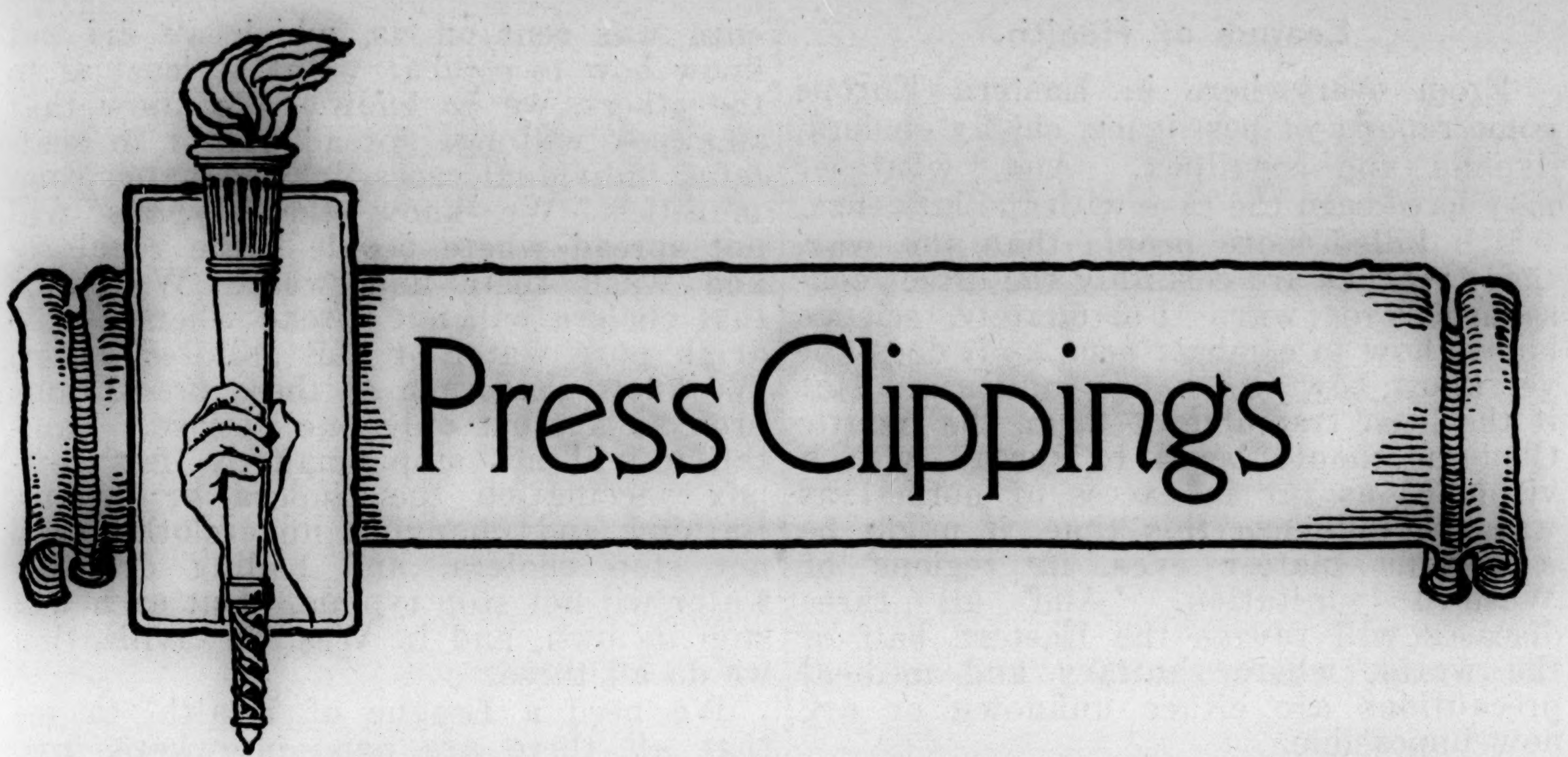
Vallejo—33 cases "B" brand tomato puree.

A clean house with plenty of fresh air and sunshine is a long step in the direction of health, says the United States Public Health Service.

Do not take drugs to cure the headache, says the United States Public Health Service. Consult a physician, a dentist or an oculist, to see if the cause can be located. Often the eyes, or the teeth may be at fault.

Carelessness with the hands and teeth causes more deaths in America every year than carelessness with motor vehicles, says the United States Public Health Service. Keep the hands clean, free from germs, away from the mouth and visit the dentist regularly.

A person can live weeks without food, days without water, but only a few minutes without air, says the United States Public Health Service. Persons who pay but little attention to the purity of the air they breathe are not careful as to drinking water and food. Become a fresh air crank. Raise the office windows.



Press Clippings

For Public Health.

We are emphatically, first, last and all the time in favor or a department of the public health. If there is one thing more than another that is disregarded in our development, it is the feature of health.

When we say we are in favor of the public health being looked after with scrupulous attention, we do not mean that we are in favor of making the public the subject of experimentation on the part of any particular school of medicine. In fact, the less medicine of any kind, the more the public health will be subserved.

What we do mean is that the public schools shall perform the service that can never, because of ignorance and prejudice, be performed in the home. The average father or mother knows little about the health of their children or themselves. They have had no health training and have learned to depend on "doctors."

The public schools should have a trained nurse broad enough to recognize the fact that nature is the only healer in all the world and that it will repair all damages if it has a fair show. She ought to know that drugs are poisons and that the less they are inflicted on the human anatomy the better. She ought to know that cleanliness is absolutely necessary to healthfulness and that the wrong foods are as fatal as drugs.

The nurse who is paid at public expense is just as necessary as the teacher paid at public expense. One cultivates the mind, and the other the body. Many permanent defects in human anatomy could be righted in infancy by the skill of a trained nurse. Defective eyesight, adenoids and other slight ailments soon become permanent if neglected.

The examination by medical boards during the draft period developed the fact that with all our boasted civilization the percentage of physical defectives was enormous. This nation is not alone in this condition, but it offers no excuse to cite other countries just as bad. The United States should set the pace in all lines of progress and particularly in the physical development of its citizenry.

It is true that no school of healing should be taught to the exclusion of others; that no school of medicine should be boosted or endorsed. That is not necessary. It would be as inappropriate as the teaching of a particular sect or creed in religion. The principles of morality are nevertheless essential, and the principles of health are equally so.

The best that a school nurse could do with the present divided sentiment is to find out the defects in the child, ascertain the cause of such defects and take the matter up with its parents as the final arbiter. If they desire a particular kind of treatment, the duty of the nurse is performed, whatever the result.

The efficiency of the people must be increased if the nation is to perform its function of leadership among the nations of the world. Too many persons are inefficient. They over-eat, indulge in wrong foods, accumulate dangerous fat, which is nothing more than accumulations of waste matter that should be expelled, and when ripe age comes, if it ever does, they are broken and defective and unable to enjoy that period of life which should be the most happy and contented.

Professor Arthur Keith, lecturing before the Royal Institute of Health in advocacy of a national department of health in England, said in a country where health was properly cared for 1000 men of draft age should furnish 700 soldiers to grade I (men capable of full military duty), 200 to grade II (men fit for less strenuous forms of military duty), 75 to grade III (men unfit for any form of active physical employment), and 25 to grade IV (men totally unfit from a physical point of view).

Instead of that, certain industrial centers in Great Britain furnished 190 men to grade I, 270 to grade II, 410 to grade III, and 130 to grade IV.

We hope the school boards of Covina will see to it that a competent school nurse is employed to look after the general health and physical welfare of the growing generation.—*Covina Citizen.*

League of Health.

From everywhere in Eastern Europe come reports of pestilence, chiefly cholera, typhus and smallpox. And, whatever may have been the case with the influenza, which killed more people than the war, these plagues are certainly the direct consequences of war. Fortunately, science knows how to combat them, as it does not yet know how to combat influenza. But if the least tractable of them, the Asiatic Cholera, should begin to spread with a virulence as far in excess of normal as was the influenza this time, it might be a serious matter even in regions of Western sanitation. And all three diseases will ravage the Eastern half of the world, where sanitary and medical precautions are either unknown or are now impossible.

The price of the war, the world must pay, and this is a part of it. But we may at least have the poor pride of the Pharisee that we are relatively safe against this particular penalty. It was perhaps for this very sin of pride, in our ability to meet pestilence, that the influenza was sent on us, which we did not know how to combat. But at least as to the others, we do know. We know that smallpox will not spread except in scattered individual cases, in vaccinated communities. We know that typhus will not spread where people bathe regularly and wash their underwear. We know that cholera will not spread where people drink pure water or boil polluted water. We know that each of these precautions protects against only one disease. Sanitation will not stop smallpox, nor cowpox vaccination the cholera or typhus. Bathing and changing underclothes will not stop cholera, and boiling drinking water wil not stop typhus. But each will stop its own, and in Western civilization we do all three.

We need a League of Health, to see that all three are done elsewhere, too. And, significantly enough, just such a league is one of the things provided in the peace treaty. We are going to organize the world not merely to stop killing each other with guns and poison gas, but to stop killing each other with microbes, also.—*Fresno Republican.*

Public Health and the Rights of Individuals to Disregard It.

The war, with its cost of millions of lives, is over. The war to prevent the unnecessary loss of as many millions by disease is steadily growing more widespread.

We all have to die, and most of us have to be sick. No campaign for public health, no advance in medical science, is going to change those facts. But we can live longer on the average and we can suffer less, and we can be steadily more effective in a physical way, than we are now. We can if we choose.

John Stuart Mill, writing on "Liberty" along in the middle of the nineteenth century, declared that a man had the same right to neglect his mental and spiritual health if he choose, that he had to neglect the health of his body.

He had the same right to believe what he chose as he had to eat what he chose. He had the same right to expose himself to what the majority regarded as pernicious doctrine as he had to expose himself to what the majority regarded as pernicious disease.

Mill may have been right about the doctrine. But the general concensus of opinion today is that he was wrong about the disease. A man has a right to liberty clear up to the line where his liberty interferes with the liberty of others. Beyond that line the principle of social interference begins properly to work.

Where shall that line be drawn, so far as disease is concerned? Everybody knows there is a wide difference of opinion. Compulsory vaccination still is regarded by many as tyranny. Compulsory quarantine is still evaded by some on principle.

But by and large, we have adopted the principle that individual health is a proper matter for community and national oversight. And there will be found few who will not admit that social investigation of the causes and spread of disease is essential.

What we do not know is amazing in its area. In the case of influenza the doctors were practically helpless. Along came a germ which was apparently very similar to two other germs, the action of which is well understood; and it swept away in two months more than twice as many lives, in our camps alone, as the explosives and exposure of war took of our soldiers.

And yet, what we do know is still more remarkable. We have practically rid our armies of typhoid. We have entirely rid them of smallpox. We have made malaria an incident; it used to be a pestilence. We have checked infantile paralysis in its early stages; it might easily have been a desperate scourge.

And we are today spending a great deal more money and intelligence than ever before on the investigation of disease. There are fifty organizations to one, a thousand dollars available compared to every one, for such investigation half a century ago.

The war has made us see more clearly than ever the necessity of conserving the most valuable things in the world—life and health.

Our growing interest in public health will not fetch on the millennium, any more than our growing knowledge of public economics; but it is a good sign, and we may honestly rejoice in it.—*San Francisco Examiner.*

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